About Lung Cancer

Get an overview of lung cancer and the latest key statistics in the US.

Overview and Types

If you have been diagnosed with lung cancer or are worried about it, you likely have a lot of questions. Learning some basics is a good place to start.

- What Is Lung Cancer?

Research and Statistics

See the latest estimates for new cases of lung cancer and deaths in the US and what research is currently being done.

- Key Statistics for Lung Cancer
- What's New in Lung Cancer Research?

What Is Lung Cancer?

- Normal structure and function of the lungs
- Types of lung cancer
- Other types of lung tumors

Lung cancer is a type of cancer that starts in the lungs. Cancer starts when cells in the body begin to grow out of control. To learn more about how cancers start and spread, see What Is Cancer?[1]

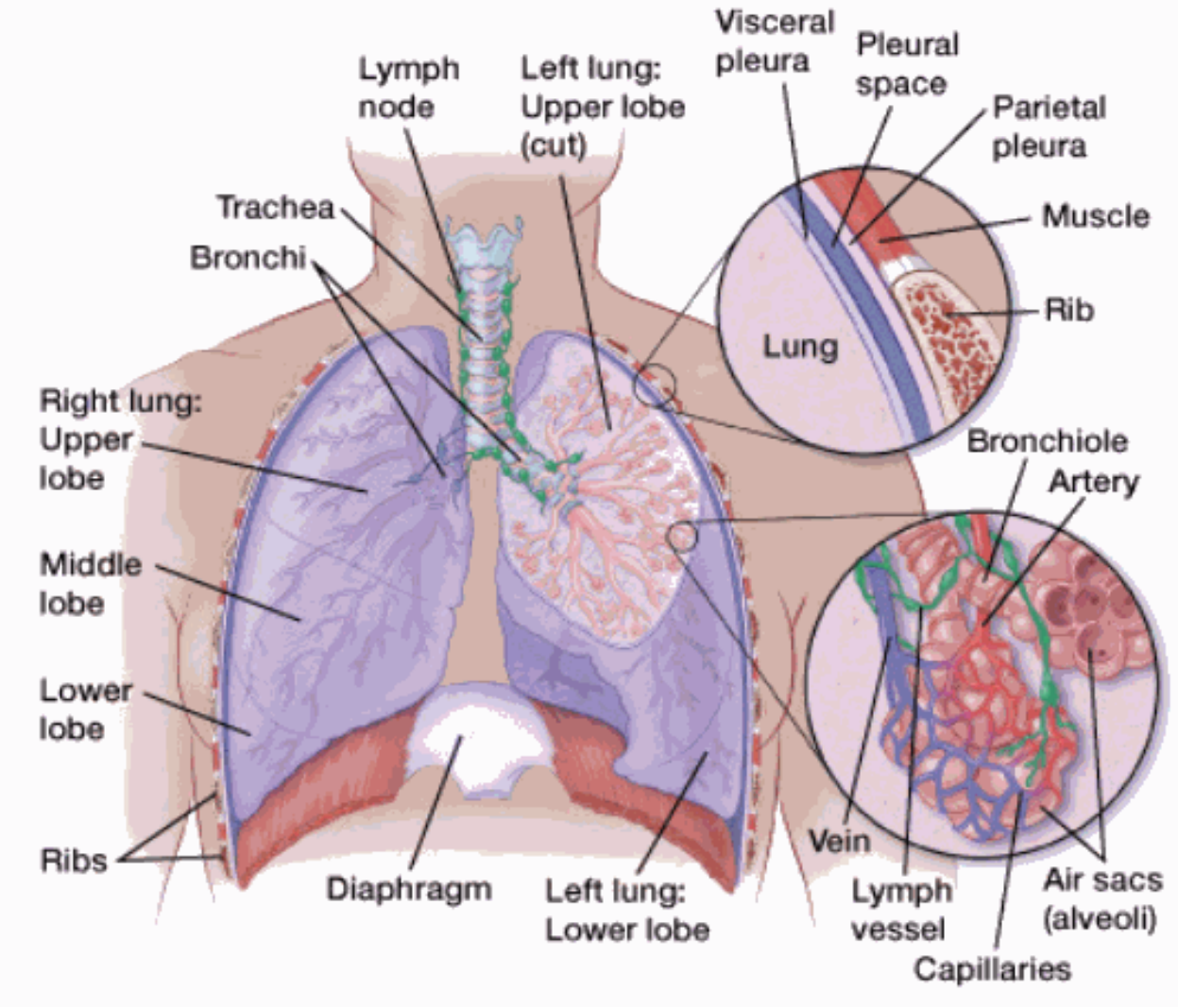
Normal structure and function of the lungs

Your lungs are 2 sponge-like organs in your chest. Your right lung has 3 sections, called **lobes**. Your left lung has 2 lobes. The left lung is smaller because the heart takes up more room on that side of the body.

When you breathe in, air enters through your mouth or nose and goes into your lungs through the **trachea** (windpipe). The trachea divides into tubes called **bronchi**, which enter the lungs and divide into smaller bronchi. These divide to form smaller branches called **bronchioles**. At the end of the bronchioles are tiny air sacs known as **alveoli**.

The alveoli absorb oxygen into your blood from the inhaled air and remove carbon dioxide from the blood when you exhale. Taking in oxygen and getting rid of carbon dioxide are your lungs' main functions.

Lung cancers typically start in the cells lining the bronchi and parts of the lung such as the bronchioles or alveoli.



A thin lining layer called the **pleura** surrounds the lungs. The pleura protects your lungs and helps them slide back and forth against the chest wall as they expand and contract during breathing.

Below the lungs, a thin, dome-shaped muscle called the **diaphragm** separates the chest from the abdomen. When you breathe, the diaphragm moves up and down, forcing air in and out of the lungs.

Types of lung cancer

There are 2 main types of lung cancer.

Non-small cell lung cancer (NSCLC)

About 80% to 85% of lung cancers are NSCLC. The main subtypes of NSCLC are adenocarcinoma, squamous cell carcinoma, and large cell carcinoma. These subtypes, which start from different types of lung cells, are grouped together as NSCLC because their treatment and prognoses (outlook) are often similar.

Adenocarcinoma: Adenocarcinomas start in the cells that would normally secrete substances such as mucus.

This type of lung cancer occurs mainly in people who smoke or used to smoke, but it is also the most common type of lung cancer seen in people who don't smoke. It is more common in women than in men, and it is more likely to occur in younger people than other types of lung cancer.

Adenocarcinoma is usually found in the outer parts of the lung and is more likely to be found before it has spread.

People with a type of adenocarcinoma called **adenocarcinoma in situ** (previously called **bronchioloalveolar carcinoma**) tend to have a better outlook than those with other types of lung cancer.

Squamous cell carcinoma: Squamous cell carcinomas start in squamous cells, which are flat cells that line the inside of the airways in the lungs. They are often linked to a history of smoking and tend to be found in the central part of the lungs, near a main airway (bronchus).

Large cell (undifferentiated) carcinoma: Large cell carcinoma can appear in any part of the lung. It tends to grow and spread quickly, which can make it harder to treat. A subtype of large cell carcinoma, known as **large cellneuroendocrine carcinoma (LCNEC)**, is a fast-growing cancer that is very similar to small cell lung cancer.

Other subtypes: A few other subtypes of NSCLC, such as adenosquamous carcinoma and sarcomatoid carcinoma, are much less common.

Small cell lung cancer (SCLC)

About 10% to 15% of all lung cancers are SCLC. It is sometimes called **oat cell cancer.**

This type of lung cancer tends to grow and spread faster than NSCLC. In most people with SCLC, the cancer has already spread beyond the lungs at the time it is diagnosed. Since this cancer grows quickly, it tends to respond well to chemotherapy[2] and[3]radiation therapy[4]. Unfortunately, for most people the cancer will return at some point.

Other types of lung tumors

Along with the main types of lung cancer, other tumors can occur in the lungs.

Lung carcinoid tumors: Carcinoid tumors of the lung account for fewer than 5% of lung tumors. Most of these grow slowly. For more information about these tumors, see Lung Carcinoid Tumor.[5]

Other lung tumors: Other types of lung cancer such as adenoid cystic carcinomas, lymphomas, and sarcomas, as well as benign lung tumors such as hamartomas are rare. These are treated differently from the more common lung cancers and are not discussed here.

Cancers that spread to the lungs: Cancers that start in other organs (such as the breast[6], pancreas[7], kidney[8], or skin[9]) can sometimes spread (metastasize) to the lungs, but these are not lung cancers. For example, cancer that starts in the breast and spreads to the lungs is still breast cancer, not lung cancer. Treatment for metastatic cancer to the lungs is based on where it started (the primary cancer site).

Hyperlinks

1. www.cancer.org/cancer/understanding-cancer/what-is-cancer.html
2. www.cancer.org/cancer/types/lung-cancer/treating-small-cell/chemotherapy.html
3. www.cancer.org/cancer/small-cell-lung-cancer/treating/radiation-therapy.html
4. www.cancer.org/cancer/types/lung-cancer/treating-small-cell/radiation-therapy.html
5. www.cancer.org/cancer/types/lung-carcinoid-tumor.html
6. www.cancer.org/cancer/types/breast-cancer.html
7. www.cancer.org/cancer/types/pancreatic-cancer.html
8. www.cancer.org/cancer/types/kidney-cancer.html
9. www.cancer.org/cancer/types/skin-cancer.html

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Key Statistics for Lung Cancer

Most lung cancer statistics include both small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC). In general, about 10% to 15% of all lung cancers are SCLC, and about 80% to 85% are NSCLC.

How common is lung cancer?

Lung cancer (both small cell and non-small cell) is the second most common cancer in both men and women in the United States (not counting skin cancer[1]). In men, prostate cancer[2] is more common, while in women breast cancer[3] is more common.

The American Cancer Society's estimates for lung cancer in the US for 2023 are:

- About 238,340 new cases of lung cancer (117,550 in men and 120,790 in women)
- About 127,070 deaths from lung cancer (67,160 in men and 59,910 in women)

Lung cancer mainly occurs in older people. Most people diagnosed with lung cancer are 65 or older; a very small number of people diagnosed are younger than 45. The average age of people when diagnosed is about 70.

Lung cancer is by far the leading cause of cancer death in the US, accounting for about 1 in 5 of all cancer deaths. Each year, more people die of lung cancer than of colon[4], breast, and prostate cancers combined.

On a positive note, the number of new lung cancer cases continues to decrease, partly because more people are quitting smoking[5] (or not starting). The number of deaths from lung cancer continues to drop as well, due to fewer people smoking and advances in early detection and treatment.

Lifetime chance of getting lung cancer

Overall, the chance that a man will develop lung cancer in his lifetime is about 1 in 16; for a woman, the risk is about 1 in 17. These numbers include both people who smoke and those who don't smoke. For people who smoke the risk is much higher, while for those who don't, the risk is lower.

- Black men are about 12% more likely to develop lung cancer than White men. The rate is about 16% lower in Black women than in White women.
- Black and White women have lower rates than men, but the gap is closing. The lung cancer rate has been dropping among men over the past few decades, but

only for about the last decade in women.
- Despite their overall risk of lung cancer being higher, Black men are **less** likely to develop SCLC than are White men.

Statistics on survival in people with lung cancer vary depending on the type of lung cancer, the stage (extent) of the cancer when it is diagnosed, and other factors. For survival statistics, see Lung Cancer Survival Rates[6].

Despite the very serious prognosis (outlook) of lung cancer, some people with earlier-stage cancers are cured.

Visit the American Cancer Society's[7]Cancer Statistics Center for more key statistics.

Hyperlinks

1. www.cancer.org/cancer/types/skin-cancer.html
2. www.cancer.org/cancer/types/prostate-cancer.html
3. www.cancer.org/cancer/types/breast-cancer.html
4. www.cancer.org/cancer/types/colon-rectal-cancer.html
5. www.cancer.org/cancer/risk-prevention/tobacco.html
6. www.cancer.org/cancer/types/lung-cancer/detection-diagnosis-staging/survival-rates.html
7. cancerstatisticscenter.cancer.org/

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What's New in Lung Cancer Research?

Research into the prevention, early detection, and treatment of lung cancer is being done in many medical centers worldwide.

Prevention

Tobacco

Prevention offers the greatest opportunity to fight lung cancer. Decades have passed since the link between smoking and lung cancers became clear, but smoking is still responsible for most lung cancer deaths. Research is continuing on:

- Ways to help people quit smoking[1] and stay tobacco-free through counseling, nicotine replacement, and other medicines
- Ways to convince young people to never start smoking
- Inherited differences in genes that may make some people much more likely to get lung cancer if they smoke or are exposed to someone else's smoke (secondhand smoke)

Environmental causes

Researchers also continue to look into some of the other causes of lung cancer, such as exposure to radon[2] and diesel exhaust[3]. Finding new ways to limit these exposures could possibly save many more lives.

Diet, nutrition, and medicines

Researchers are looking for ways to use vitamins or medicines to prevent lung cancer in people at high risk, but so far none have been shown to clearly reduce risk.

Some studies have suggested that a diet high in fruits and vegetables may offer some protection, but more research is needed to confirm this. While any protective effect of fruits and vegetables on lung cancer risk is likely to be much smaller than the increased risk from smoking, following the American Cancer Society dietary recommendations[4] (such as staying at a healthy weight and eating a diet high in fruits, vegetables, and whole grains) may still be helpful.

Early detection

As mentioned in Can Lung Cancer Be Found Early?[5], screening with spiral CT scans in people at high risk of lung cancer (due to smoking history) lowers the risk of death from lung cancer, when compared to chest x-rays.

Another approach now being studied uses newer, sensitive tests to look for cancer cells in sputum samples. Researchers have found several changes often seen in the DNA of lung cancer cells. Studies are looking at tests that can spot these DNA changes to see if they can find lung cancers at an earlier stage.

Diagnosis

Fluorescence bronchoscopy

Also known as **autofluorescence bronchoscopy**, this technique might help doctors find some lung cancers earlier, when they are likely to be easier to treat. For this test, the doctor inserts a bronchoscope through the mouth or nose and into the lungs. The end of the bronchoscope has a special fluorescent light on it, instead of a normal (white) light.

The fluorescent light causes abnormal areas in the airways to show up in a different color than healthy parts of the airway. Some of these areas might not be visible under white light, so the color difference can help doctors find these areas sooner.

Electromagnetic navigation bronchoscopy

Lung tumors near the center of the chest can be biopsied during bronchoscopy, but bronchoscopes have trouble reaching the outer parts of the lungs, so tumors in these areas often need to be biopsied by passing a needle through the skin.

This newer approach can help a doctor use a bronchoscope to biopsy a tumor in the outer part of the lung. First, CT scans are used to create a virtual bronchoscopy. The abnormal area is identified, and a computer helps guide a bronchoscope to the area so that it can be biopsied. The bronchoscope used has some special attachments that allow it to reach further than a regular bronchoscope.

This takes special equipment and training, and it is not widely available at this time.

Treatment

Surgery

Doctors now use video-assisted thoracic surgery (VATS) to treat some small lung tumors. This procedure lets doctors remove parts of the lung through smaller incisions, which can mean shorter hospital stays and less pain for patients. Doctors are now studying if VATS can be used for larger lung tumors.

In a newer approach to this type of operation, the surgeon sits at a specially designed control panel inside the operating room to maneuver long surgical instruments using robotic arms. This approach, known as **robotic-assisted surgery**, is now being used in some larger cancer centers. It is not clear at this time if this type of surgery is better than current traditional surgery for lung cancer.

Real-time tumor imaging

Researchers are looking to use new imaging techniques, such as four-dimensional computed tomography (4DCT), to help improve treatment. In this technique, the CT machine scans the chest continuously for about 30 seconds. It shows where the tumor is in relation to other structures as a person breathes, as opposed to just giving a ‘snapshot’ of a point in time, like a standard CT does.

To help doctors deliver radiation more precisely to a tumor, 4DCT can be used to determine exactly where the tumor is during each part of the breathing cycle. This technique might also be used to help show if a tumor is attached to or invading important structures in the chest, which could help doctors determine if a patient might be eligible for surgery.

Targeted therapy drugs

Researchers are learning more about the inner workings of lung cancer cells that control their growth and spread. This work had led to the development of new targeted therapy[6]drugs, many of which are already being used to treat NSCLC. Targeted drugs that are approved for use in other cancer types are now being studied in NSCLC that have a change in the RET gene. These drugs include sunitinib, sorafenib, vandetanib, and cabozantinib.

Brain metastases: Brain metastases are a common problem in people with lung cancer and often result in worse outcomes. Whole brain radiation is the usual treatment and can have certain long-term side effects. For people with limited spread of lung cancer to the brain, newer radiation techniques, like SRS[7], allow for only the specific tumor to be treated with radiation while sparing the rest of the brain. This type of radiation has fewer side effects and is still effective in treating the cancer.

A new drug, AZD3759, is being tested in early clinical trials and shows promising results in people with NSCLC with an *EGFR* gene change and spread to the brain. The drug seems to be able to cross the blood-brain barrier.

Another investigational oral drug, epitinib, a kinase inhibitor, has also shown some encouraging results in treating brain metastases in NSCLC patients with the *EGFR* gene change.

Maintenance therapy

For people with advanced lung cancers who get chemotherapy, combinations of 2 chemo drugs (sometimes along with a targeted drug) are typically given for about 4 to 6 cycles. Some studies have found that with NSCLC cancers that have not worsened on treatment, continuing treatment with a single chemo drug such as pemetrexed or with a targeted drug beyond the 4 to 6 cycles may help some people live longer. This is known as **maintenance therapy**. A possible downside to this continued treatment is that people may not get a break from treatment side effects. Maintenance therapy is recommended more often now, but it is not an option for some people whose cancer is not under control or who are in poor health.

Immune treatments

Researchers are developing immunotherapy drugs that can help a person's immune system fight the cancer.

Immune checkpoint inhibitors: Cancer cells can sometimes avoid being attacked by the body's immune system by using certain "checkpoints" that normally keep the immune system in check. For example, cancer cells often have a lot of a protein called PD-L1 on their surface that helps them evade the immune system. New drugs that block the PD-L1 protein, or the corresponding PD-1 protein on immune cells called **T cells**, can help the immune system recognize the cancer cells and attack them. Some of these drugs are now approved for use in advanced NSCLC.

Studies are currently evaluating if giving an immunotherapy drug along with radiation therapy in people who can't have surgery, can improve shrinkage of the tumor and maybe help people live longer.

Lung Cancer Research Highlights [8]
See examples of research we conduct and fund through grants to see how the American Cancer Society is working toward a world without lung cancer.

Hyperlinks

1. www.cancer.org/cancer/risk-prevention/tobacco/guide-quitting-smoking.html
2. www.cancer.org/cancer/risk-prevention/radiation-exposure/radon.html
3. www.cancer.org/cancer/risk-prevention/chemicals/diesel-exhaust-and-cancer.html
4. www.cancer.org/cancer/risk-prevention/diet-physical-activity/acs-guidelines-nutrition-physical-activity-cancer-prevention.html
5. www.cancer.org/cancer/types/lung-cancer/detection-diagnosis-staging/detection.html
6. www.cancer.org/cancer/types/lung-cancer/treating-non-small-cell/targeted-therapies.html
7. www.cancer.org/cancer/types/lung-cancer/treating-small-cell/radiation-therapy.html
8. www.cancer.org/research/acs-research-highlights/lung-cancer-research-highlights.html

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